

FIRE PROTECTION TANK DESIGN INTENT
2003 NFPA 22 , 2002 NFPA 13, and 2006 IBC
To Accompany Architectural Review

Listed items require revision/clarification by contractual documentation (i.e., revised drawings, specifications, addenda, etc.) before plans can be approved. *Answers in letter form are not acceptable.* The Design Intent must be submitted by a Tennessee registered fire protection sprinkler system designer. **Starting construction before plan approval may be considered as just cause, by the State, to issue a stop work order. [Rule 0780-2-7-.09]**

Submittal Requirements

1. Provide two sets of fire protection tank design drawings with preliminary hydraulic calculations submitted by a Tennessee registered designer.

General

1. Identify the type of tank to be installed – elevated gravity tank, ground level suction tank, or pressure tank. [NFPA 22 1.5] Provide applicable design load values on plans as outlined in NFPA 22 4.12.
2. Tanks must be sized to meet the remote area demand for the intended duration.
 - A. Show preliminary hydraulic calculations with system demand - flow gpm at residual psi.
 - B. Determine and show duration of water supply needed for building use and type of sprinkler system (30 gpm for NFPA 13R systems and light hazard NFPA 13 systems) [2002 NFPA 13R 6.5.2, NFPA 13 Table 11.2.3.1.1, and 11.2.3.1.2]
 - C. Tank size equals flow demand times duration
 - D. Calculate elevation height necessary to provide system pressure for elevated tanks
3. The location of tanks must be such that the tank and structure are not subject to fire exposure. [NFPA 22 4.2.1] If lack of yard room makes this impracticable, exposed steel must be fire proofed or protected by open sprinklers. [NFPA 22 4.2.1.1] Fireproofing must have a fire-resistance rating of 2-hours and be provided for steelwork within 20 feet of exposures, combustible buildings or windows, and doors. [NFPA 22 4.2.1.2 and 4.2.2]
4. Tank roofs must be provided and with vents when airtight. [NFPA 22 4.14.1 and 4.15.1]
5. Design drawings must include the following. [NFPA 22 13.1.5.2]
 - A. The size and arrangement of all pipes;
 - B. Size, location, and type of all valves, tank heater, and other accessories;
 - C. Steam pressures available at the heater;
 - D. Arrangement of, and full information regarding, the steam supply and return system together with pipe sizes, and;
 - E. Details of construction of the frostproof casing.
6. Water tank must have a water level gauge and be supervised indicating abnormal high or low water level. [NFPA 22 13.1.11]

7. Lightning protection must be installed per 2004 NFPA 780, *Standard for the Installation of Lightning Protection Systems*. [NFPA 22 4.9]
8. Pipe Connections and Fittings. [NFPA 22 Chapter 13]
 - A. Frostproof casing. [NFPA 22 13.1.12]
 - B. Check valves. [NFPA 22 13.2.11 and 13.4.1]
 - C. Controlling valves. [NFPA 22 13.2.12]
 - D. Filling pumps. [NFPA 22 13.4.2]
 - E. Steel pipe must comply with NFPA 22 13.1.15
9. Discharge pipe must be minimum 6 in. for tanks up to and including 25,000 gallons, 8 in. for tanks 30,000 to 100,000 gallons, and 10 in. for greater capacities. [NFPA 22 13.2.2.2]
10. Provide details showing how the tank is to be filled. [NFPA 22 13.4]
11. Valve Pit or Valve House with heater must be provided. [NFPA 22 Chapter 14]
 - A. Where the tank is on an independent tower, a valve pit or house must be built at the base of the discharge pipe to house the valves, tank heater, and other fittings. [NFPA 22 14.1.1.1]
 - B. Where a large valve pit is provided below grade, it must contain all equipment, including the check valve in the horizontal run. [NFPA 22 14.1.1.2] Where the valve pit is located below grade, it must be built of portland cement concrete with a clean aggregate. [NFPA 22 14.1.2.1]
 - C. Where a house that is located above grade with no large pit beneath it is used, it must be necessary to place the OS&Y gate valve in the vertical part of the tank discharge pipe and to construct a small brick or concrete pit or well to contain the check valve in the horizontal pipe below the frost line. [NFPA 22 14.1.1.3] A valve house that is located above grade must be constructed of concrete, brick, cement plaster on metal lath, or other noncombustible material with suitable heat-insulating properties. [NFPA 22 Table 14.1.2.4]
12. Water temperature must be supervised and protected against freezing. [NFPA 22 Chapter 15 and 2002 NFPA 72 5.13.4]
 - A. The heating system must be of such capacity that the temperature of the coldest water in the tank or riser, or both, is maintained at or above 42°F during the coldest weather. [NFPA 22 15.1.2]
 - B. A low water temperature alarm set at 40°F must be provided. [NFPA 22 15.1.2.2]